

ministers to taste, that, in the houses of the wealthy, delightful patterns of work of Pompeian elegance are soon introduced.

As with the bricks, so with the mortar and the wood employed in building; they are rendered, as far as possible, free of moisture. Sea-sand containing salt, and wood that has been saturated with sea-water, two common commodities in badly-built houses, find no place in our modern city.

The most radical changes in the houses of our city are in the chimneys, the roofs, the kitchens, and their adjoining offices. The chimneys, arranged after the manner proposed by Mr. Spencer Wells, are all connected with central shafts, into which the smoke is drawn, and, after being passed through a gas furnace to destroy the free carbon, is discharged colourless into the open air. The city, therefore, at the expense of a small smoke rate, is free of raised chimneys and of the intolerable nuisance of smoke. The roofs of the houses are but slightly arched, and are indeed all but flat. They are covered either with asphalt, which experience, out of our supposed city, has proved to last long and to be easily repaired, or with flat tile. The roofs, barricaded round with iron palisade, tastefully painted, make excellent outdoor grounds for every house. In some instances flowers are cultivated on them.

The housewife must not be shocked when she hears that the kitchens of our model city, and all the kitchen offices, are immediately beneath these garden roofs; are, in fact, in the upper floor of the house instead of the lower. In every point of view, sanitary and economical, this arrangement succeeds admirably. The kitchen is lighted to perfection, so that all uncleanness is at once detected. The smell which arises from cooking is never disseminated through the rooms of the house. In conveying the cooked food from the kitchen, in houses where there is no lift, the heavy-weighted dishes have to be conveyed down, the emptied and lighter dishes upstairs. The hot water from the kitchen boiler is distributed easily by conducting pipes into the lower rooms, so that in every room and bedroom hot and cold water can at all times be obtained for washing or cleaning purposes; and as on every floor there is a sink for receiving waste water, the carrying of heavy pails from floor to floor is not required. The scullery, which is by the side of the kitchen, is provided with a copper and all the appliances for laundry work; and when that is done at home, the open places on the roof above make an excellent drying ground.

In the wall of the scullery is the upper opening to the shaft of the dust-bin. This shaft, open to the air from the roof, extends to the bin under the basement of the house. A sliding door in the wall opens into the shaft to receive the dust, and this plan is carried out on every floor. The coal-bin is off the scullery, and is ventilated into the air through a shaft, also passing through the roof.

On the landing in the second or middle stories of the three-storied houses there is a bath-room, supplied with hot and cold water from the kitchen above. The floor of the kitchen and of all the upper stories is slightly raised in the centre, and is of smooth grey tile; the floor of the bath-room is the same. In the living-rooms, where the floors are of wood, a true oak margin of floor extends two feet around each room. Over this no carpet is ever laid. It is kept bright and clean by the old-fashioned bees'-wax and turpentine, and the air is made fresh and ozonic by the process.

Considering that a third part of the life of man is, or should be, spent in sleep, great care is taken with the bedrooms, so that they shall be thoroughly lighted, roomy, and ventilated. Twelve hundred cubic feet of space is allowed for each sleeper, and from the sleeping apartments all unnecessary articles of furniture and of dress are rigorously excluded. Old clothes, old shoes, and other offensive articles of the same order are never permitted to have residence there. In most instances the rooms on the first floor are made the bedrooms, and the lower the living-rooms. In the larger houses bedrooms are carried out in the upper floor for the use of the domestics.

To facilitate communication between the kitchen and the entrance-hall, so that articles of food, fuel, and the like may be carried up, a shaft runs in the partition between two houses, and carries a basket lift in all houses that are above two stories high. Every heavy thing to and from the kitchen is thus carried up and down from floor to floor and from the top to the basement, and much unnecessary labour is thereby saved. In the two-storied houses the lift is unnecessary. A flight of outer steps leads to the upper or kitchen floor.

(To be continued.)

NOTES

THE reorganisation of the German Seewarte at Hamburg makes very satisfactory progress. To the Third Section is assigned the duty of issuing storm-warnings for the German coasts, and the investigation of the meteorological conditions on which the warnings depend. Hitherto meteorology has been prosecuted in Germany exclusively in its climatic aspects. It is now intended, whilst keeping in view what is required for climatic researches, to give more special attention to the investigation of weather-conditions, simultaneously observed over a wide area, and to the movements and changes taking place in the great currents of the atmosphere. In carrying out these objects, stations of the first order are established at Hamburg, Memel, Neufahrwasser, near Danzig, Swinemünde, Warnemünde, Keitum in Sylt, Borkum, Wilhelmshafen, and Kiel, at which, in addition to the ordinary instruments of observation, self-registering barometers and anemometers are erected. At these places observations are made at 8 A.M., noon, and 4 and 8 P.M., of which the observations at 8 A.M. and 4 P.M. are sent by telegraph to Hamburg. To these nine stations and some others on the German coasts at which wind and weather only are noted, the Seewarte intends to add sixteen others, situated inland in different parts of Germany, in selecting which particular attention is to be given to the position of the station and the instruments, so that really good observations of wind and temperature will in each case be furnished. The action taken by the German Seewarte to secure that the observations of temperature and wind will be of such a quality that they can be used in scientific investigations of weather changes, is deserving of all praise, the more so since these observations as at present made are often of very doubtful quality and in many cases worse than useless, considered as data for weather-inquiries.

ON the occasion of the centenary of the Genevan Society of Arts, founded in 1776, that body proposes to offer a number of prizes in its various departments. A most important service which the Academy will render to horology will be the International Competition in the Regulation of Pocket Chronometers. The trials of these chronometers will take place at the Geneva Observatory, under the superintendence of M. Plantamour, the director. All chronometers intended for the competition must be forwarded to him before mid-day of February 14, 1876. All competitors not resident in Geneva should correspond with the Observatory through a resident agent, who will manage all the details. M. J. B. Grandjean, president of the Section of Horology of the class, offers his services gratuitously to makers who have no agent in Geneva. Each chronometer should be accompanied by a paper containing data to identify the chronometer, details of its construction, &c. The trial will last fifty-two days from February 15, 1876, divided into nine periods. In a hot chamber and in an ice-house (*glacière*) the chronometers will be tested by being placed in all possible positions. All chronometers not complying with the following conditions will be excluded from competition:—1. The mean variation from day to day ought not to exceed six-tenths of a second so long as the chronometer preserves the same position in the Hall of the Observatory. 2. The values which express the mean rates during each of the periods except that of the hot chamber and the ice-house, ought to agree with their mean in the limits of two seconds more or less. 3. The error of compensation determined by the comparison of the rates in the hot chamber and in the ice-house ought not to exceed two-tenths of a second of degree centigrade. 4. The difference of rates between periods six and nine (both in the Observatory Hall, horizontal position, dial above), *i.e.* before and after the proofs relative to temperature, ought not to be above one second in twenty-four hours. The value of the results obtained in the trials which con-

cern the two former conditions will have an importance double that which will be given to the two latter. No competitor can receive two prizes. A sum of 3,000 francs at least will be devoted for the purpose of awarding gold medals, or an equivalent value, to competitors who will have been judged worthy. A number of medals in silver and bronze will also be awarded. Those who wish for further details concerning this and other competitions, should apply to the Secretary of the Academy.

OUR readers will hear with regret that the well-known observatory at Twickenham, belonging to Mr. Bishop, and presided over by Mr. Hind, is shortly to be dismantled and the instruments presented to the Royal Observatory at Naples. This, however, will probably not take place till the latter part of next year. Mr. Bishop has, we believe, been induced to part with his Twickenham property mainly on account of the benefit he found from residence in a southern climate. Not wishing to sell his scientific apparatus, he offered it by letter through Prof. de Gasparis to the Italian Government for the use of the Royal Observatory of Naples, where we believe an equatorial instrument of about the dimensions of the one at Twickenham was much desired. The offer was accepted in the first instance by telegram, and Mr. Bishop has this week received the formal authorisation of the Italian Minister of Public Instruction permitting the gift for the use of the Observatory at Naples. The most useful portion of the valuable library collected by Mr. Bishop's father (so long treasurer of the Royal Astronomical Society) may probably accompany the instruments.

IN 1859 Napoleon III. published a decree ordering that a prize of 20,000 francs should be presented every two years by the French Institute, each of the five academies being in turn authorised to nominate the candidate, and the choice to be ratified by the whole body of the Institute. The first laureate was M. Thiers, proposed by the Académie Française for 1861, on the ground of the excellency of his historical works. In 1863 the prize was proposed by the Academy of Inscriptions, and given to M. Jules Oppert, for his Assyrian discoveries. In 1865 M. Wurtz was proposed by the Academy of Sciences, for his discoveries in chemistry. In 1867 M. Henri Martin was selected by the Academy of Moral Sciences, for his History of France. In 1869 M. Guizot was elected by the Académie Française, using its right for the second time. In 1873 the Academy of Inscriptions selected M. Mariette, for his Egyptian discoveries. The Academy of Sciences having to exert its prerogative this year, has, it is stated, selected M. Paul Bert. It appears that the ground of selection is his "discoveries on the effects of oxygen in the act of respiration." M. Claude Bernard declared that these discoveries are the most astounding which have been made since Priestley discovered that gas. These conclusions will not be accepted without opposition, even in France, although the Academy is said to have ratified the award without any objection. The lamented *Zenith's* ascent was organised in order to test the accuracy of M. Bert's conclusions.

THE Natural Science Lectures at Cambridge during the Michaelmas term present several new features of interest. The list of lectures, practical courses, and classes is now, happily, so long that it is impossible for us to notice them in detail. Prof. Dewar will commence his career as a Cambridge Professor, and inaugurate a new departure in the history of the Jacksonian Chair, by lecturing on Dissociation and Thermal Chemistry. Prof. Liveing's laborious course of instruction in Spectroscopic Analysis, in which successive batches of students are taught at successive hours of the afternoon, will be resumed. Mr. Apjohn will lecture on Volumetric Analysis, at Caius Laboratory, and Dr. H. N. Martin on Physiological Chemistry at Christ's College. Prof. Liveing promises a course on the History of Chemistry in the ensuing May term. In addition to Mr. Bridge's

ordinary course of practical work in Comparative Anatomy, a valuable series of lectures with practical instruction in Morphology will be given by Mr. F. Balfour, of Trinity, and Mr. A. M. Marshall, of St. John's. Dr. Michael Foster's usual course of Practical Physiology and Histology will this term meet in two sections, elementary and advanced. Prof. Hughes's courses are divided into three sets. On Tuesdays he will lecture on Physical Geography and Elementary Geology; Thursdays, on the period represented by the depositions between the Lower New Red (Permian) and the top of the chalk inclusive; Saturdays, on various unconnected vexed questions. Prof. Hughes may be expected to propound many novel views, which Prof. Hull called heresies at Bristol, as to the Permian, Rhætic, and Triassic beds.

PROF. STOKES lectures at Cambridge this term on Double Refraction and Polarisation, Prof. Challis on Practical Astronomy and Magnetism, and Prof. Cayley on a course of Pure Mathematics.

INTELLIGENCE has been received at Sydney that the expedition under the leadership of Mr. Macleay, which left Sydney in the *Chevert* about four months ago, to explore New Guinea, has become disorganised, and is returning. At the same time a report has reached Sydney that a large navigable river has been discovered in New Guinea.

DURING the past week the Social Science Association has been holding its meetings at Brighton. In all the Sections much business was done in the way of reading papers and subsequent discussion, though we regret to see that the attendance, especially of townspeople, was considerably below previous years. Few of the papers call for notice by us. The most striking, if not indeed the most valuable paper read, was that of Dr. B. W. Richardson, which we print elsewhere. The inaugural address, by Lord Aberdare, dealt with the subject of "Crime." Of other papers read we may note that of Sir Charles Reed, president of the Education Section, on the subject of "Education," principally dealing with its elementary aspect. A paper was read by the Hon. G. C. Brodrick on the question, "How can the influence of the Universities be most effectively exerted in the general education of the country?" Among other methods of reform he advocated the encouragement of literary and scientific research by University grants. Mr. Brodrick evidently is of opinion that our two great Universities are still far behind the age, and this was the tone of the discussion which followed. Miss Sherriff's paper on the question, "Is a fair proportion of the endowments of the country made applicable to female education?" is worthy of attention. In the course of the paper she gave an account of the progress of the Girls' Public Day School Company.

THE Sea-Lions, the expected arrival of which we mentioned last week, reached London on Tuesday, and were forwarded to Brighton yesterday.

DR. CARPENTER has declined to stand for the Lord Rectorship of Aberdeen University.

DR. W. J. RUSSELL has been appointed Examiner in Chemistry at the Royal College of Physicians, London.

THE open Scholarship at St. Bartholomew's Hospital, value 100*l.*, has been awarded this year to Mr. C. Pardey Lukis.

WE have had forwarded to us two photographs of a mounted specimen of an almost complete Solitaire (*Pezophaps solitarius*), found, with a second, in the island of Rodriguez, in the June of this year, by Mr. J. Caldwell, the Assistant Colonial Secretary of Mauritius, and Sergeant Morris. These specimens, together with that procured by Mr. Slater, one of the naturalists to the Venus Transit Expedition, will settle some points in the oste-

ology of the peculiar extinct Columbine birds, of which so many separate bones have been obtained.

SOME interesting results were given by Mr. H. M. Taylor, Fellow and Tutor of Trinity College, Cambridge, in a paper "On the Relative Values of the Pieces at Chess," read before the British Association at Bristol. He found by a mathematical process that if a knight and king of different colours were placed on a chessboard at random, the odds against the king being in check were 11 to 1; if a bishop and a king, 31 to 5; if a rook and a king, 7 to 2; and if a queen and a king, 23 to 13. If, however, we consider only safe check (*i.e.* check in which the king is unable to take the piece), the odds are respectively 11 to 1, 131 to 13, 5 to 1, 107 to 37. From these numbers we can obtain a fair theoretical measure of the relative values of the pieces. Thus, if we take as our measure the chance of safe check, the values of the knight, bishop, rook, and queen are in the ratio 12, 13, 24, 37, while the values of these pieces in the same order as given by Staunton are 3.05, 3.50, 5.48, and 9.94, the value of the pawn being taken as unity. Mr. Taylor remarks that the value of a pawn depends so much on the fact that it is possible to convert it into a queen, that the method does not appear applicable to it.

MESSRS. H. S. KING and Co. will publish, during the forthcoming season, the following new volumes of their International Scientific Series:—"Animal Parasites and Messmates," by M. Van Beneden, Professor of the University of Louvain, and Correspondent of the Institute of France. It will contain eighty-three illustrations.—"The Nature of Light," with a general account of physical optics, by Dr. Eugene Lommel, Professor of Physics in the University of Erlangen. This work will contain a table of spectra in chromolithography and a large number of other illustrations.—"The Five Senses of Man," by Professor Bernstein, of the University of Halle.—"Fermentations," by Professor Schutzenberger, Director of the Chemical Laboratory at the Sorbonne; and a new edition of Dr. Hermann Vogel's "Chemical Effects of Light and Photography."

Two nests of English Humble-bees were last week sent to New Zealand by Mr. Frank Buckland, for the Canterbury Acclimatisation Society. These insects are specially desired in New Zealand for the purpose of fertilising the common clover; the proboscis of the common bee is not sufficiently long to reach down to the pollen of the clover flower, while the humble-bee is enabled to do so. In this way the insect is expected to do great service to the agriculturist by largely extending the growth of the clover. The bees were packed in their own nests in two boxes, and will be under the charge of a member of the New Zealand Council, who is provided with every necessary for their welfare during the voyage. They are expected to arrive about the middle of January—midsummer at the antipodes.

THE production of silk in South America is rapidly increasing both in quantity and quality. At a local exhibition recently held at Buenos Ayres, some samples, both raw and manufactured, were shown, which compared favourably with the best silks of Asia. The climate of Brazil seems to be especially well suited for the cultivation of the silkworm, which feeds on the leaves of the *Palma christi*, a plant which grows in abundance in the country. The Government of Brazil is said to be contemplating offering subsidies for the cultivation of silkworms in the country.

ALMOST every day the French *Journal Officiel* publishes a list of professorships created by the Government in the several academies, principally in the provinces, in order to enable them to sustain any competition which may be eventually offered by the free academies. The law of the liberty of instruction will benefit unquestionably not only the public at large, but also the official universities, in raising a spirit of emulation.

A PROFESSOR of the Academy of Grenoble, M. Violle, made several balloon ascents in the Alps last summer in order to measure the degree of heat generated by the sun, and consequently the temperature emanating from that body. It is said by the *Liberté* that M. Violle is quite opposed to the idea that the degree of temperature is immense; he says that it is not much hotter than temperatures produced in the laboratories. Details will shortly be published in the *Comptes Rendus*.

THE *Geographical Magazine* for October contains a detailed account of the voyage of the Arctic Expedition from Portsmouth to Waigat, and of the work of the *Valorous*. A map of part of the North Atlantic showing the tracks of the three ships accompanies the paper, the sea being tinted according to depth. There is also a section of the Atlantic showing the soundings of the *Valorous*, and a plan of the harbour of Holsteinberg, off which the ship grounded.

THE *Times* and other London papers of Tuesday contain letters from members of the *Pandora* Arctic Expedition, under Capt. Young. The expedition reached Disco on August 7, and all was going well, though on the way out squalls and contrary winds had been met with. Capt. Young was to leave Disco on the 10th.

PROF. ED. MORREN has published a small biography of Charles de l'Escluse, commonly known as Clusius, after whom a small order of plants was named by Lindley. Born in 1526 and dying in 1609, he was for sixteen years Professor of Botany at the University of Liège. His works are comprised in two folio volumes—"Rariorum Plantarum Historia," and "Exoticorum Libri Decem," and he was one of the pre-Linnean naturalists who attempted a classification of plants founded on artificial characters.

THE first part has just been published of the long-announced "Medicinal Plants," by Messrs. Bentley and Trimen. Each part is to contain eight coloured plates of plants included in the Pharmacopœia of Britain, India, or the United States, together with letterpress comprising a full description of the plant, its nomenclature, geographical distribution, &c., and an account of its properties and uses.

In a recent number of the *Transactions of the Academy of Science of St. Louis*, Mr. Charles Riley describes the curious habits of two insects which occur alive in the pitchers of *Sarracenia variolaris*. The first is a small moth (*Xanthoptera semicrocea*), which lays its eggs within the pitcher. The young caterpillars there weave a gossamer-like web and feed on the cellular tissue of the leaf. The putrid remains of insects previously captured, which have perished, are covered over by the excrements of these caterpillars. The second is a dipterous insect (*Sarcophaga sarracenice*). The mature fly is stated to drop a number of the larvæ into the pitcher, where they feed on the decaying remains of other insects, and finally burrow through the bottom of the pitcher into the ground, where they undergo their transformations.

THE additions to the Zoological Society's Gardens during the past week include a Campbell's Monkey (*Cercopithecus campbelli*) from W. Africa, presented by Miss A. J. Brown; a Brown Bear (*Ursus arctos*) from Russia, presented by Mr. A. Vale; two Vervet Monkeys (*Cercopithecus lalandii*) from S. Africa, presented by Mr. Abbett; two Grey-breasted Parrakeets (*Bolborhynchus monachus*) from Monte Video, presented by Miss Maiden; a Peewit (*Vanellus cristatus*), European, presented by Dr. William Brewer; a Brown Bear (*Ursus arctos*) from Russia, two Argus Pheasants (*Argus gigantens*) from Malacca, an Alligator (*Alligator mississippiensis*) from the Mississippi, a Common Snake (*Tropidonotus natrix*) from South Tyrol, deposited; two Graceful Ground Doves (*Geopelia cuneata*) from Australia, received in exchange; a Scolopaceous Rail (*Aramus scolopaceus*) from S. America, purchased.